



# Assignment Sheet / Density Test

Project Number	: 23502-ZS9	Lab. Tech	: K. Ford
Project Name	: HSR	Date Completed	: 9/30/13
Date Drilled	: 9/7/13	Boring	: S0020R

## Notes:

CHEM	Sulfate/Chloride	MR	Minimum Resistivity
COLL	Collapse	PH	pH Test
CONSOL	1D Consolidation	PI	Atterberg Limits
CURV	Modified Proctor	RV	R-value
DD	Moisture Density	SA	Sieve Analysis
DS	Direct Shear	TRX	Triaxial Compression
HY	Hydrometer		



# **Assignment Sheet / Density Test**

Project Number : 23502-ZS9 Lab. Tech : K. Ford  
Project Name : HSR Date Completed : 1/20/14  
Date Drilled : 1/8/14

### Notes:

CHEM	Sulfate/Chloride	MR	Minimum Resistivity
COLL	Collapse	PH	pH Test
CONSOL	1D Consolidation	PI	Atterberg Limits
CURV	Modified Proctor	RV	R-value
DD	Moisture Density	RVT	R-value Treated
DS	Direct Shear	SA	Sieve Analysis
HY	Hydrometer	TRX	Triaxial Compression



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## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	9/23/2013
TES#:	23502-ZS9	Sample No.:	MC04-1
Boring #:	S0020R; 11-11.5'	Classification:	(SM) Silty Sand

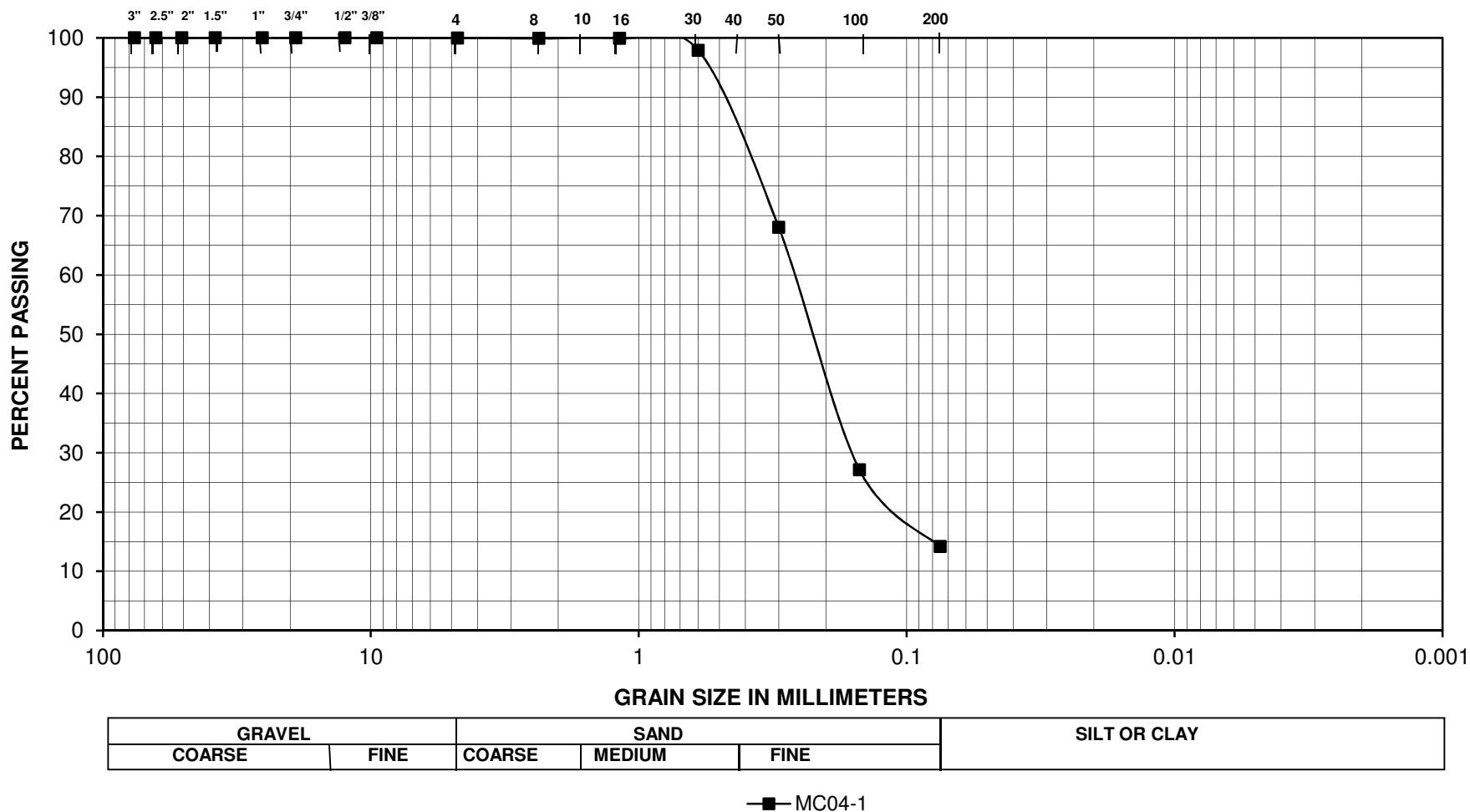
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	219.2	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	219.2	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	192.1	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.1	0.0	0.0	100.0	
#8	0.2	0.1	0.1	99.9	
#16	0.2	0.0	0.1	99.9	
#30	4.6	4.4	2.1	97.9	
#50	70.1	65.5	32.0	68.0	
#100	159.7	89.6	72.9	27.1	
#200	188.1	28.4	85.8	14.2	
Pan	192.1				



## **U.S. STANDARD SIEVE OPENING IN INCHES**

## **U.S. STANDARD SIEVE NUMBERS**





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## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	9/23/2013
TES#:	23502-ZS9	Sample No.:	SS05
Boring #:	S0020R; 16-16.5'	Classification:	(SM) Fine Silty Sand

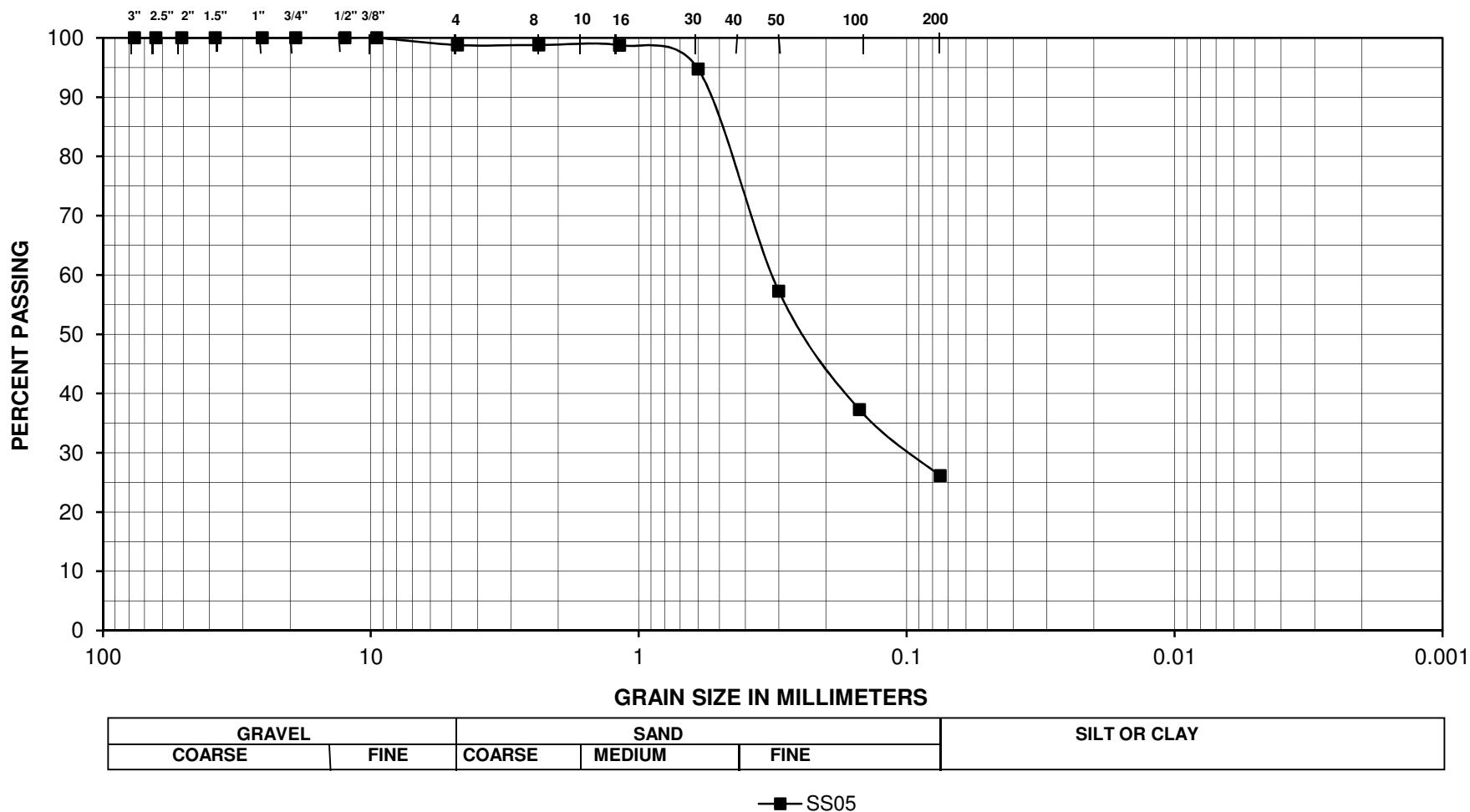
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	206.6	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	206.6	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	155.6	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	2.5	0.0	1.2	98.8	
#8	2.5	0.0	1.2	98.8	
#16	2.6	0.1	1.3	98.7	
#30	10.9	8.3	5.3	94.7	
#50	88.3	77.4	42.7	57.3	
#100	129.6	41.3	62.7	37.3	
#200	152.6	23.0	73.9	26.1	
Pan	155.6				



## **U.S. STANDARD SIEVE OPENING IN INCHES**

## **U.S. STANDARD SIEVE NUMBERS**





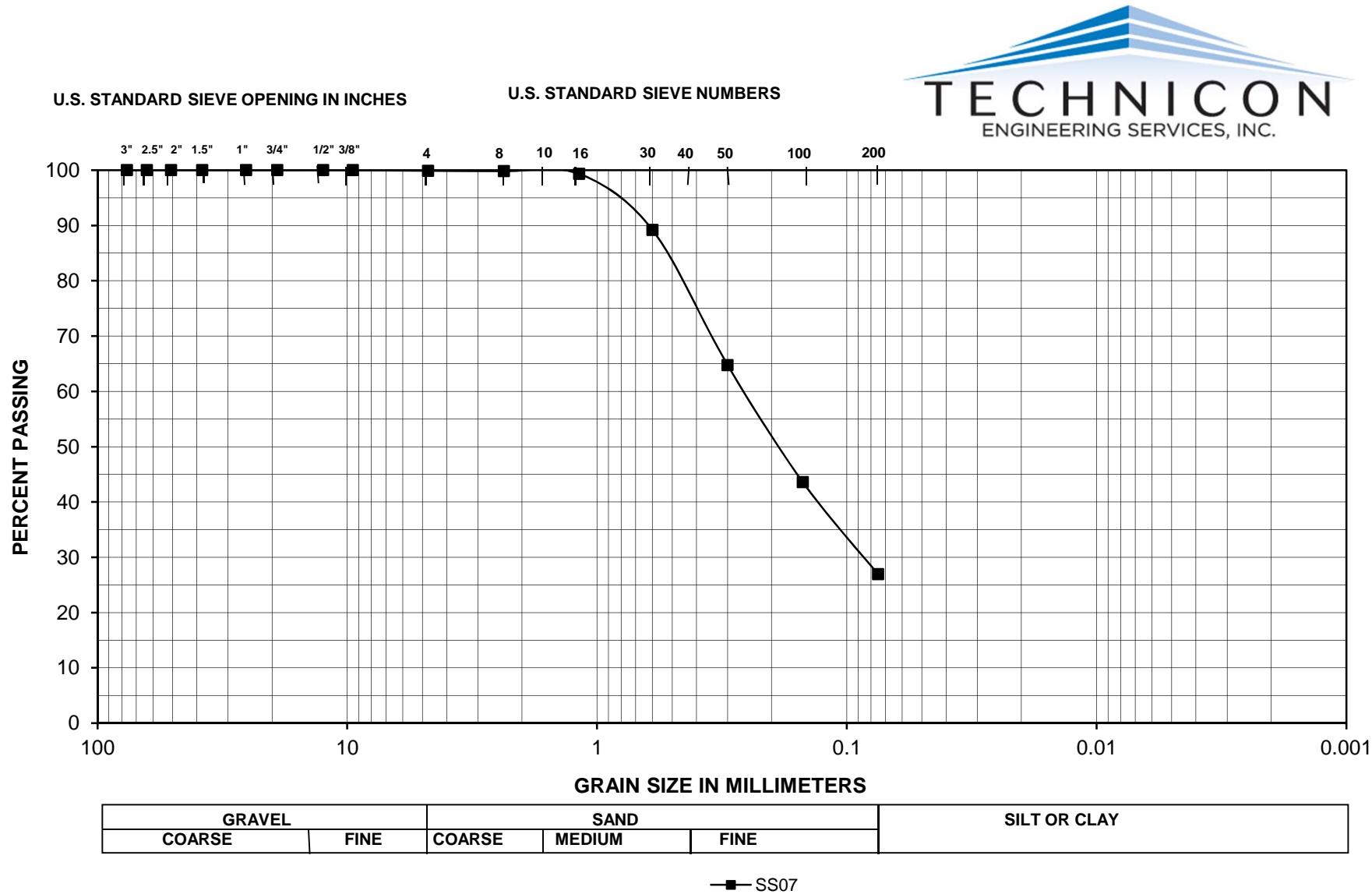
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## **Sieve Analysis for Soil / Fine Aggregate ASTM C-136**

Project:	CA HSR	Technician:	K. Ford
TES#:	23502-ZS9	Date:	1/16/2014
Boring #:	S0020R; 25-26.5'	Sample No.:	SS07
		Classification:	(SM) Silty Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	167.7	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	167.7	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	127.8	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.2	0.0	0.1	99.9	
#8	0.3	0.1	0.2	99.8	
#16	1.1	0.8	0.7	99.3	
#30	18.1	17.0	10.8	89.2	
#50	59.1	41.0	35.2	64.8	
#100	94.6	35.5	56.4	43.6	
#200	122.5	27.9	73.0	27.0	
Pan	127.8				





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## Sieve Analysis for Soil and Fine Aggregate

Project:	HSR	Technician:	K. Ford
		Date:	9/12/2013
TES#:	23502-ZS9	Sample No.:	SS09
Boring No.:	S0020R	Remarks:	(ML) Clayey Silt

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	54.9	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	54.9	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	5.5	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#10	0.0	0.0	0.0	100.0	
#16	0.0	0.0	0.0	100.0	
#30	0.3	0.5	0.5	99.5	
#40	0.1	0.2	0.7	99.3	
#50	0.4	0.7	1.5	98.5	
#100	0.8	1.5	2.9	97.1	
#200	3.5	6.4	9.3	90.7	
Pan					

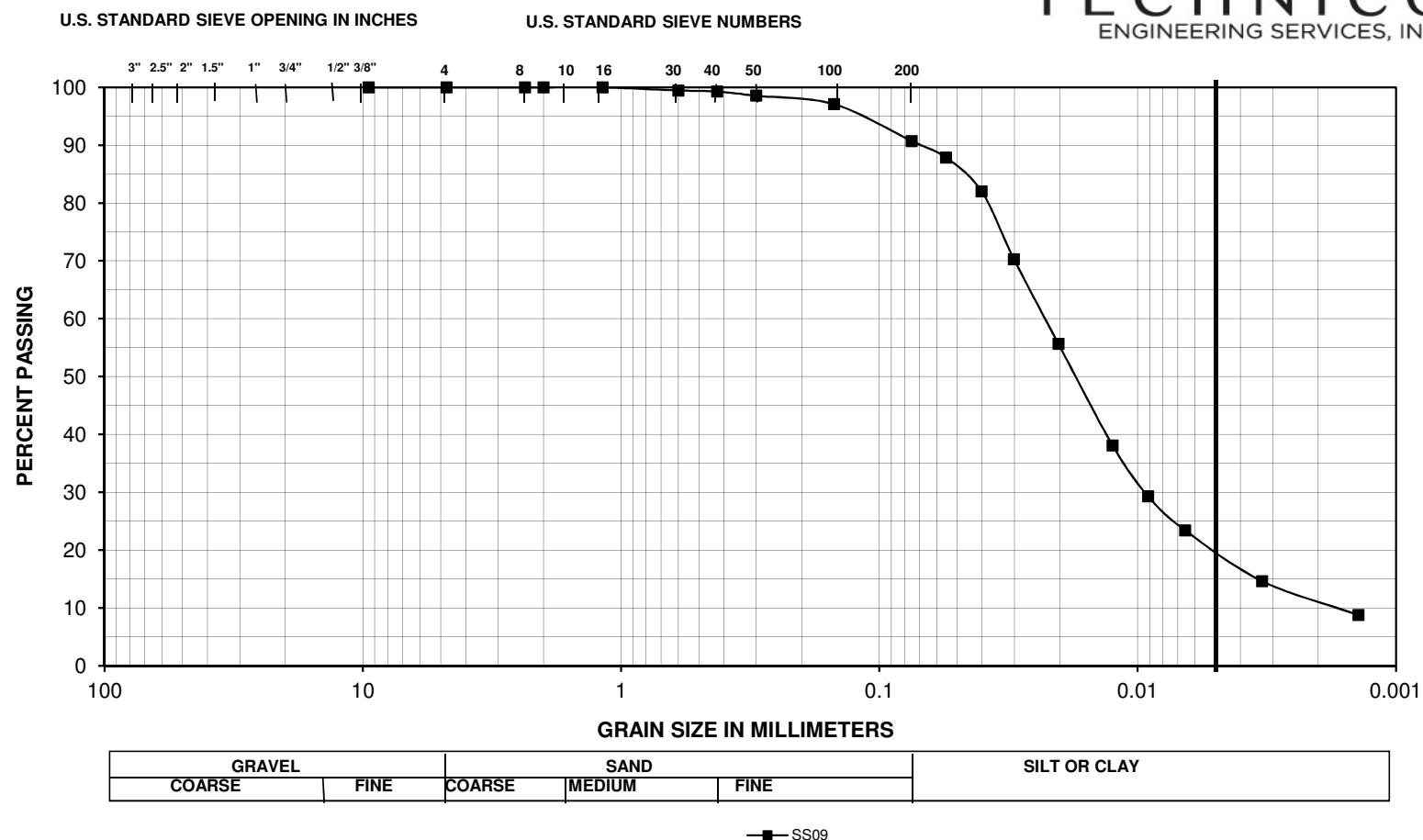


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### HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:	HSR				TESTED BY:	K. Ford			TES # :	23502-ZS9
Boring Number	SS09				TESTED BY:	K. Ford			DATE:	9/12/2013
Sample Depth, ft	36-36.5'									
Mass of Test Sample, g	55.48			"air-dried"					Hydrometer Type	151H
Mass of Hygroscopic Sample, g	29.76			"air-dried"					Specific Gravity of Test Material	2.650
Mass of Hygroscopic Sample, g	29.45			"oven-dried"					Specific Gravity of Test Solution	Varies
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)			
0.5	1.032	1.030	21	8.4	0.01348	0.0553	87.9			
1	1.030	1.028	21	8.9	0.01348	0.0402	82.0			
2	1.026	1.024	21	10.0	0.01348	0.0301	70.3			
5	1.021	1.019	21	11.3	0.01348	0.0203	55.6			
15	1.015	1.013	21	12.9	0.01348	0.0125	38.1			
30	1.012	1.010	21	13.7	0.01348	0.0091	29.3			
60	1.010	1.008	21	14.2	0.01348	0.0066	23.4			
250	1.007	1.005	21	15.0	0.01348	0.0033	14.6			
1440	1.005	1.003	21	15.5	0.01348	0.0014	8.8			
2880	1.004	1.002	21	15.8	0.01348	0.0010	5.9			



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	HSR
SS09	(ML) Clayey Silt	0	9.3	70.9	19.8	1.1				TES#:	23502-ZS9
										Boring#:	S0020R
										Date:	9/12/2013

\* Particles smaller than 5 Micron in diameter



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## Sieve Analysis for Soil and Fine Aggregate

Project:	HSR	Technician:	K. Ford
		Date:	9/12/2013
TES#:	23502-ZS9	Sample No.:	SS11
Boring No.:	S0020R	Remarks:	(ML) Clayey Silt

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	61.6	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	61.6	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	7.0	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#10	0.0	0.0	0.0	100.0	
#16	0.2	0.3	0.3	99.7	
#30	0.2	0.3	0.6	99.4	
#40	0.2	0.3	1.0	99.0	
#50	0.1	0.2	1.1	98.9	
#100	1.7	2.8	3.9	96.1	
#200	4.2	6.8	10.7	89.3	
Pan					

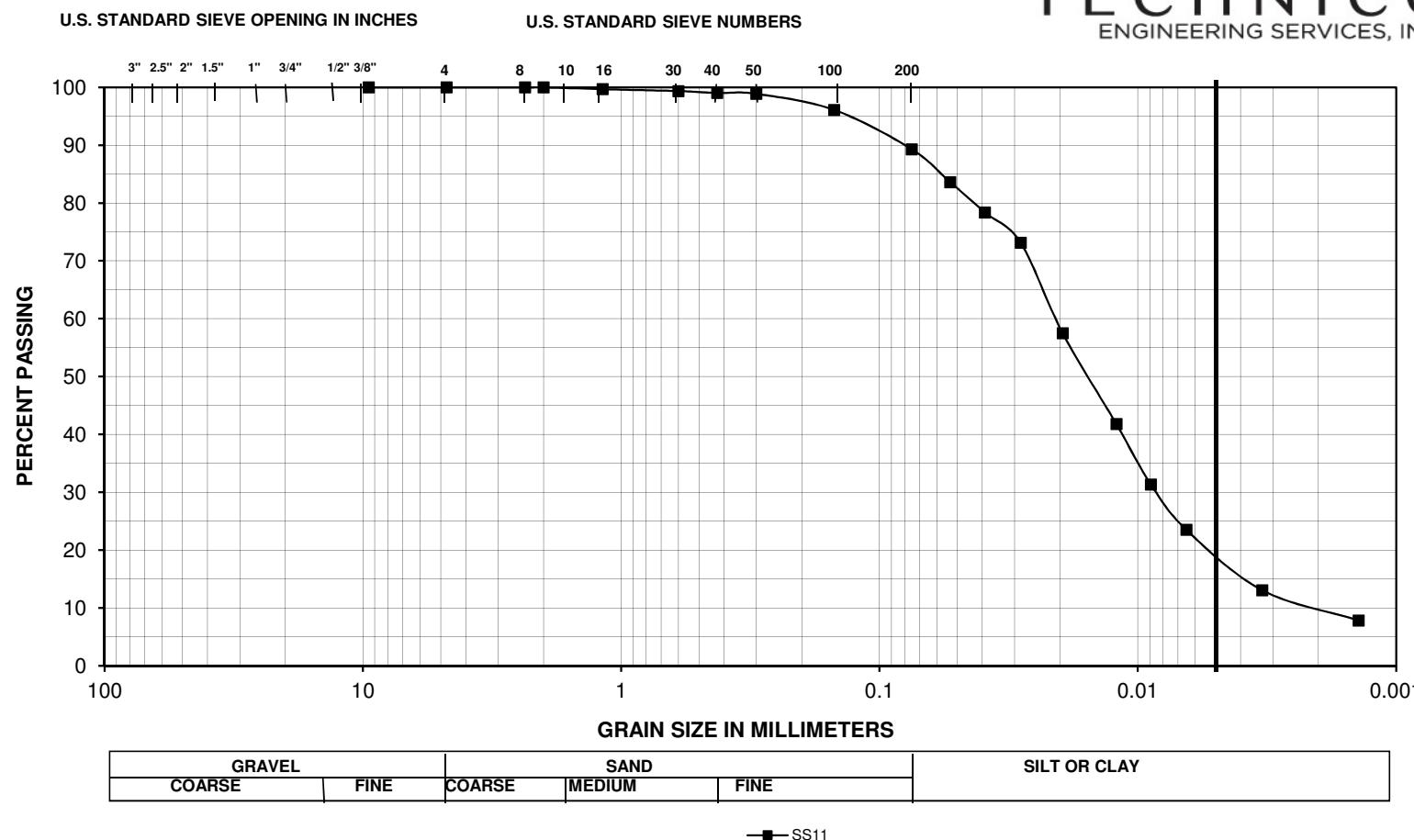


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### HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:	HSR			TESTED BY:	K. Ford	TES # :	23502-ZS9
Boring Number	SS11					DATE:	9/12/2013
Sample Depth, ft	41-41.5'						
Mass of Test Sample, g	62.26	"air-dried"		Hydrometer Type 151H			
Mass of Hygroscopic Sample, g	21.33	"air-dried"					
Mass of Hygroscopic Sample, g	21.09	"oven-dried"		Specific Gravity of Test Material		2.650	
Mass of Test Sample, g	61.56	"oven-dried"		Specific Gravity of Test Solution		Varies	
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.5	1.034	1.032	21	7.8	0.01348	0.0532	83.6
1	1.032	1.030	21	8.4	0.01348	0.0391	78.4
2	1.030	1.028	21	8.9	0.01348	0.0284	73.1
5	1.024	1.022	21	10.5	0.01348	0.0195	57.5
15	1.018	1.016	21	12.1	0.01348	0.0121	41.8
30	1.014	1.012	21	13.1	0.01348	0.0089	31.3
60	1.011	1.009	21	13.9	0.01348	0.0065	23.5
250	1.007	1.005	21	15.0	0.01348	0.0033	13.1
1440	1.005	1.003	21	15.5	0.01348	0.0014	7.8
2880	1.004	1.002	21	15.8	0.01348	0.0010	5.2



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	HSR
SS11	(ML) Clayey Silt	0	10.7	70.4	18.9	1.14				TES#:	23502-ZS9
										Boring#:	S0020R
										Date:	9/12/2013

\* Particles smaller than 5 Micron in diameter



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## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	9/23/2013
TES#:	23502-ZS9	Sample No.:	MC12-2
Boring #:	S0020R; 45.5-46'	Classification:	(ML/CL) Silty Clay

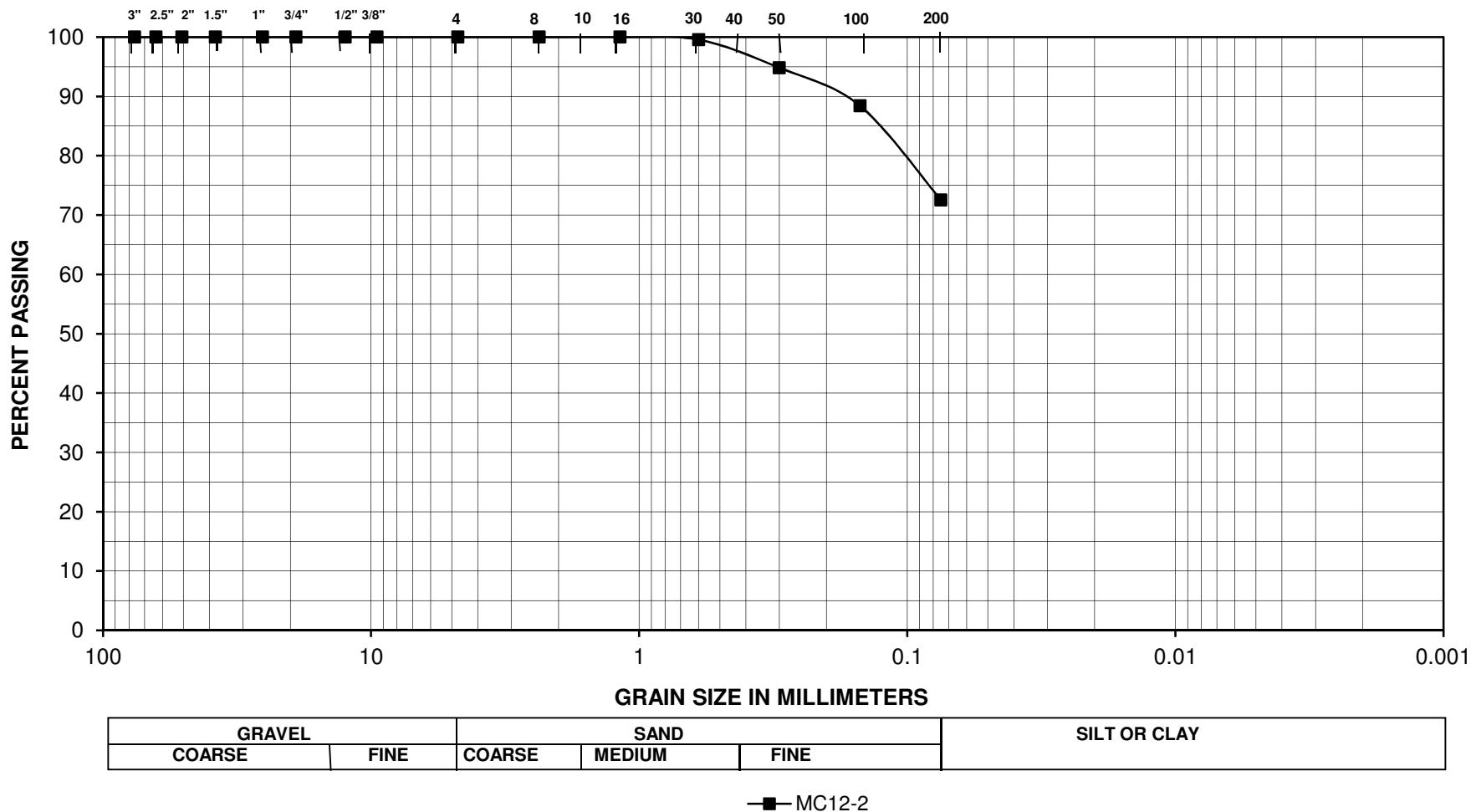
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	208.8	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	208.8	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	68.9	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.0	0.0	0.0	100.0	
#30	0.9	0.9	0.4	99.6	
#50	10.8	9.9	5.2	94.8	
#100	24.2	13.4	11.6	88.4	
#200	57.3	33.1	27.4	72.6	
Pan	68.9				



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## **U.S. STANDARD SIEVE NUMBERS**





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## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	9/23/2013
TES#:	23502-ZS9	Sample No.:	MC14-1
Boring #:	S0020R; 56-56.5'	Classification:	(ML/CL) Silty Clay

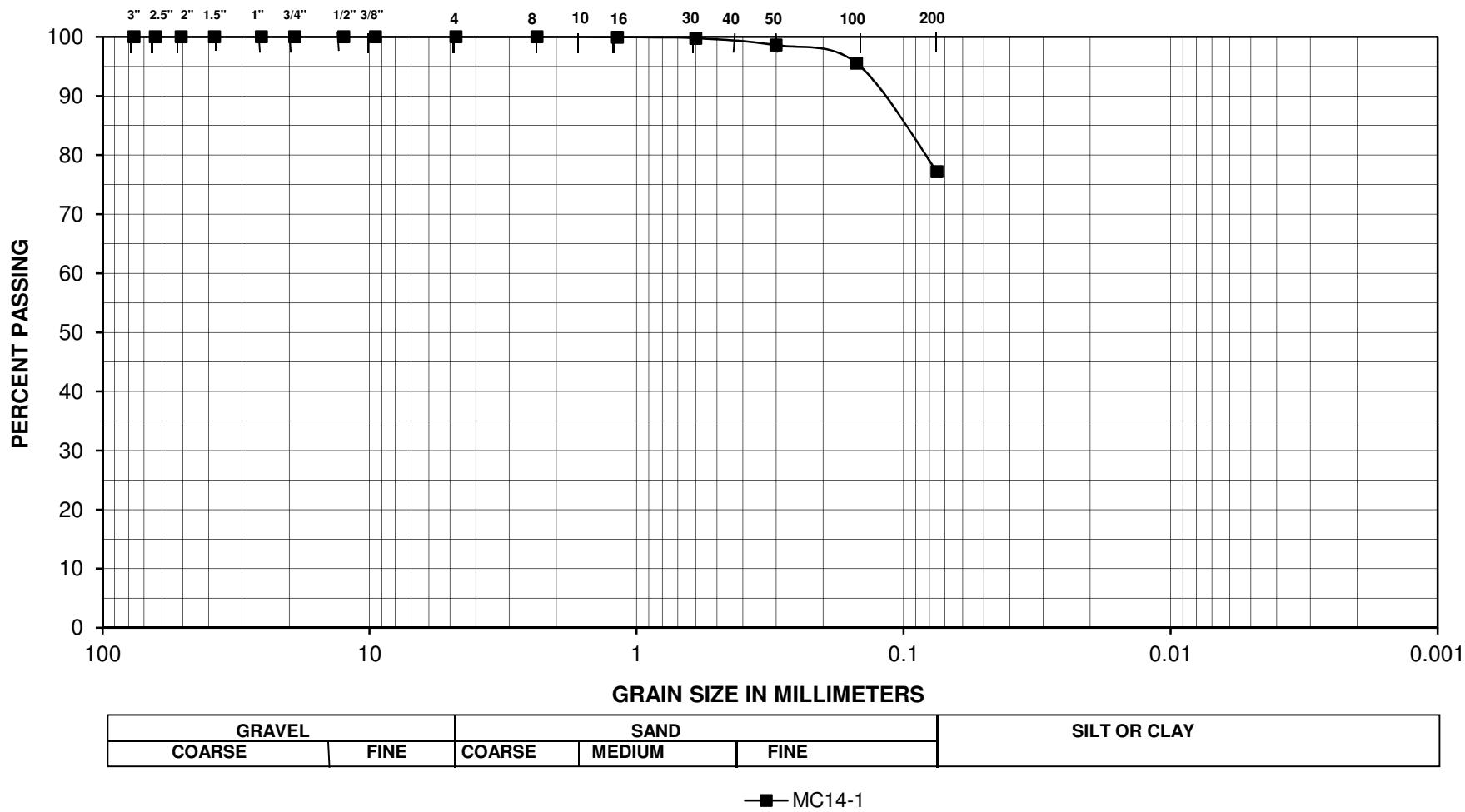
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	171.6	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	171.6	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	73.2	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.1	0.1	0.1	99.9	
#30	0.4	0.3	0.2	99.8	
#50	2.4	2.0	1.4	98.6	
#100	7.6	5.2	4.4	95.6	
#200	39.1	31.5	22.8	77.2	
Pan	73.2				



## **U.S. STANDARD SIEVE OPENING IN INCHES**

## **U.S. STANDARD SIEVE NUMBERS**





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## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	9/23/2013
TES#:	23502-ZS9	Sample No.:	MC16-1
Boring #:	S0020R; 66-66.5'	Classification:	(SP) Fine Sand

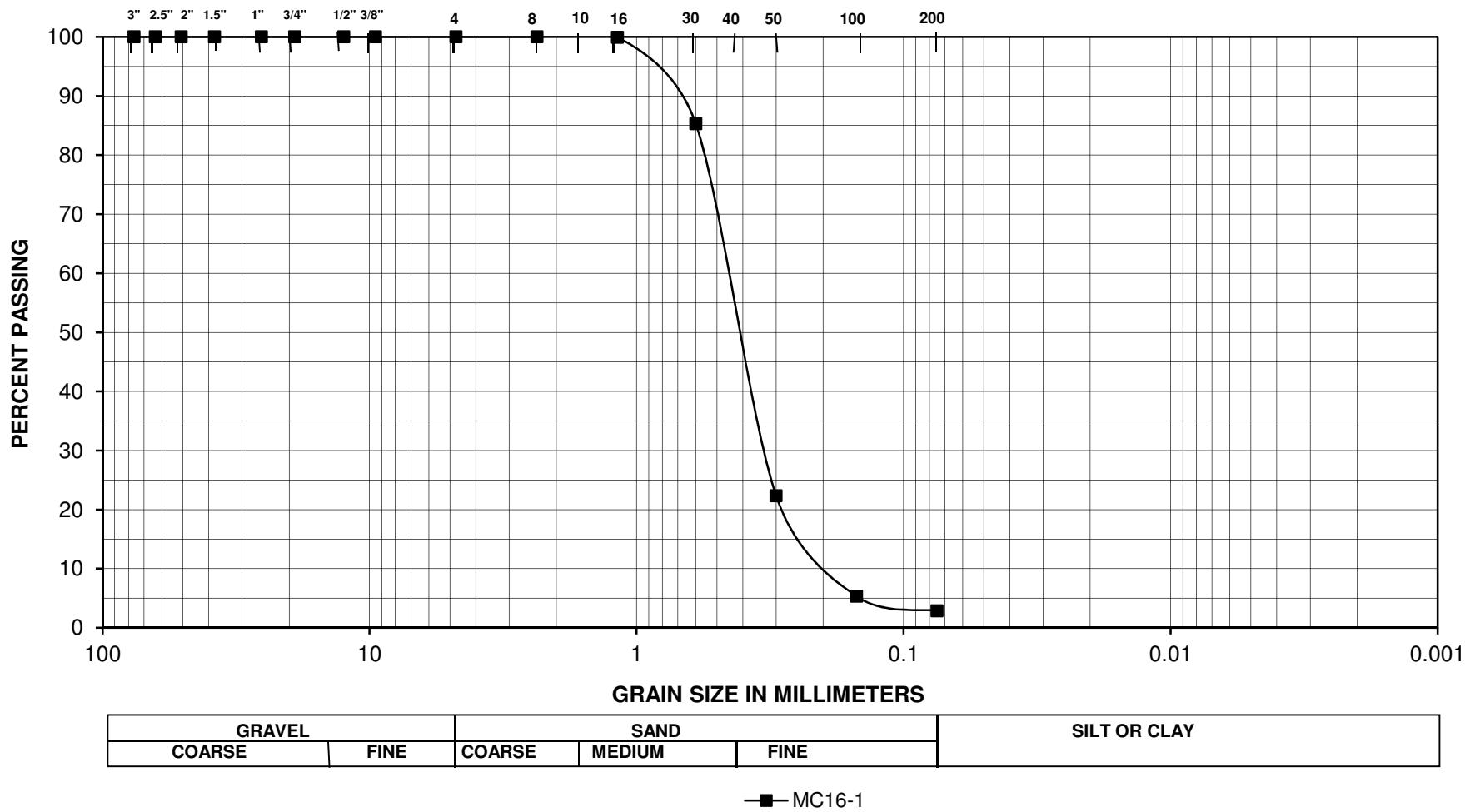
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	187.1	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	187.1	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	182.4	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.1	0.1	0.1	99.9	
#30	27.5	27.4	14.7	85.3	
#50	145.3	117.8	77.7	22.3	
#100	177.1	31.8	94.7	5.3	
#200	181.7	4.6	97.1	2.9	
Pan	182.4				



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## **U.S. STANDARD SIEVE NUMBERS**





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## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

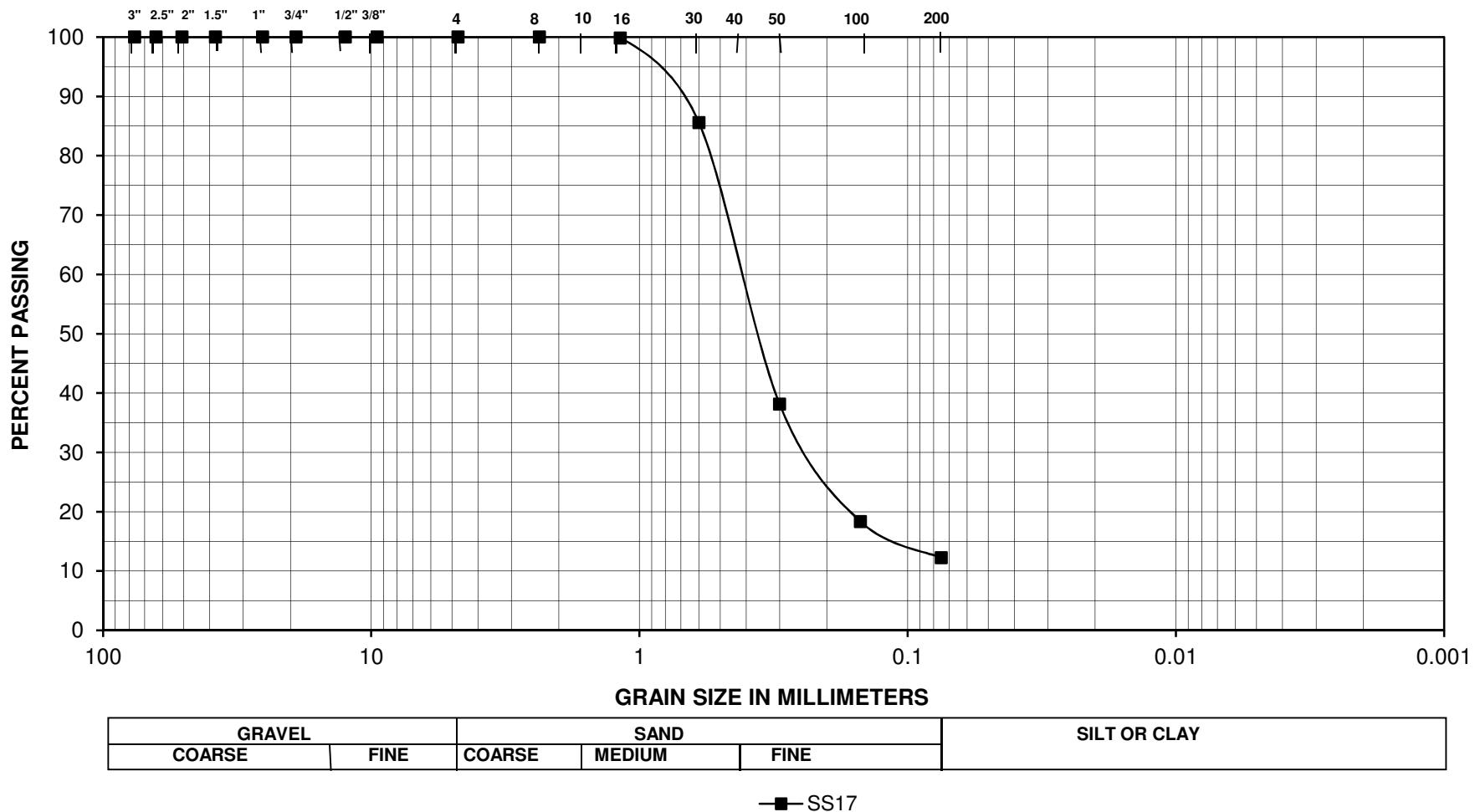
Project:	CA HSR	Technician:	K. Ford
		Date:	9/23/2013
TES#:	23502-ZS9	Sample No.:	SS17
Boring #:	S0020R; 71-71.5'	Classification:	(SP/SM) Silty Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	281.7	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	281.7	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	250	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.4	0.4	0.1	99.9	
#30	40.6	40.2	14.4	85.6	
#50	174.3	133.7	61.9	38.1	
#100	230.0	55.7	81.6	18.4	
#200	247.2	17.2	87.8	12.2	
Pan	250				



## **U.S. STANDARD SIEVE OPENING IN INCHES**





Construction Testing & Inspection \* Geotechnical & Environmental Engineering

## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	9/23/2013
TES#:	23502-ZS9	Sample No.:	MC18-2
Boring #:	S0020R; 75.5-76'	Classification:	(ML/CL) Silty Clay

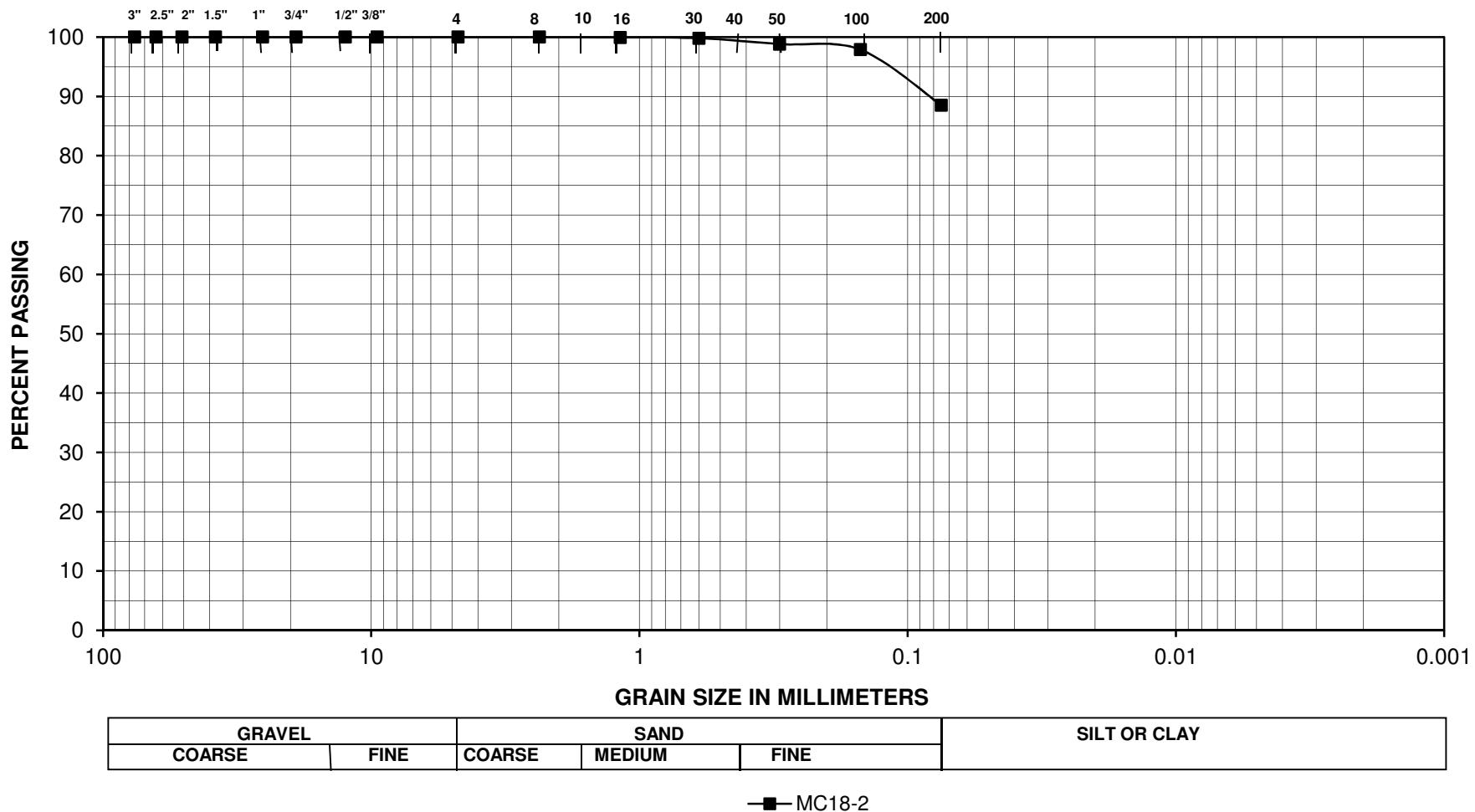
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	160.4	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	160.4	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	35.1	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.1	0.1	0.1	99.9	
#30	0.3	0.2	0.2	99.8	
#50	1.9	1.6	1.2	98.8	
#100	3.4	1.5	2.1	97.9	
#200	18.4	15.0	11.5	88.5	
Pan	35.1				



## **U.S. STANDARD SIEVE OPENING IN INCHES**

## **U.S. STANDARD SIEVE NUMBERS**





Construction Testing & Inspection \* Geotechnical & Environmental Engineering

## Sieve Analysis for Soil and Fine Aggregate

Project:	HSR	Technician:	K. Ford
		Date:	9/12/2013
TES#:	23502-ZS9	Sample No.:	SS19
Boring No.:	S0020R	Remarks:	(ML) Sandy Silt

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	63.75	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	63.75	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	28.7	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#10	0.0	0.0	0.0	100.0	
#16	0.2	0.3	0.3	99.7	
#30	1.0	1.6	1.9	98.1	
#40	3.9	6.1	8.0	92.0	
#50	9.4	14.7	22.7	77.3	
#100	9.4	14.7	37.5	62.5	
#200	4.4	6.9	44.4	55.6	
Pan					

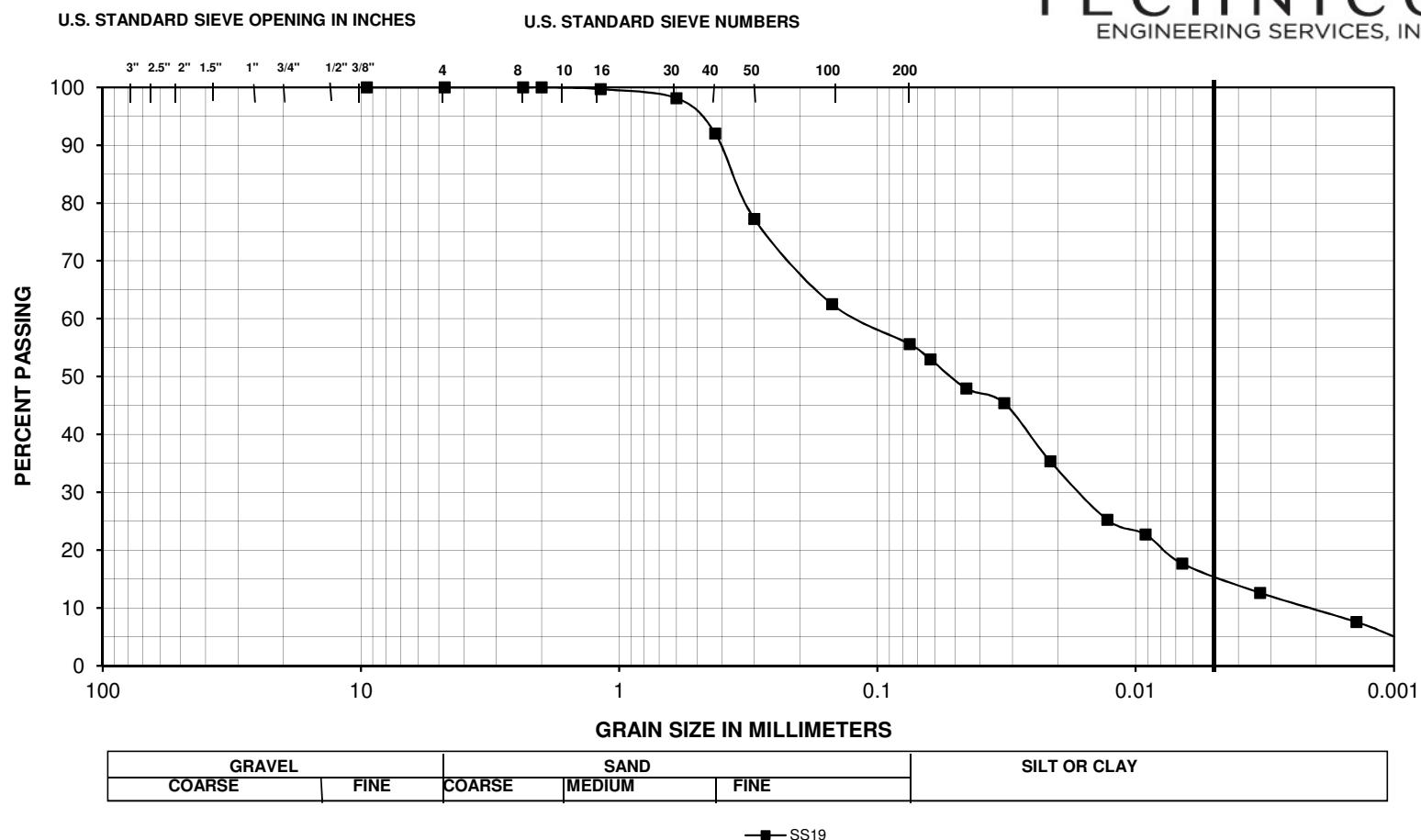


*Construction Testing & Inspection \* Geotechnical & Environmental Engineering*

### HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:	HSR			TESTED BY:	K. Ford	TES # :	23502-ZS9
Boring Number	SS19					DATE:	9/12/2013
Sample Depth, ft	36-36.5'						
Mass of Test Sample, g	64.07	"air-dried"		Hydrometer Type 151H			
Mass of Hygroscopic Sample, g	21.69	"air-dried"					
Mass of Hygroscopic Sample, g	21.58	"oven-dried"		Specific Gravity of Test Material		2.650	
Mass of Test Sample, g	63.75	"oven-dried"		Specific Gravity of Test Solution		Varies	
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.5	1.023	1.021	21	10.7	0.01348	0.0624	53.0
1	1.021	1.019	21	11.3	0.01348	0.0453	47.9
2	1.020	1.018	21	11.5	0.01348	0.0323	45.4
5	1.016	1.014	21	12.6	0.01348	0.0214	35.3
15	1.012	1.010	21	13.7	0.01348	0.0129	25.2
30	1.011	1.009	21	13.9	0.01348	0.0092	22.7
60	1.009	1.007	21	14.4	0.01348	0.0066	17.7
250	1.007	1.005	21	15.0	0.01348	0.0033	12.6
1440	1.005	1.003	21	15.5	0.01348	0.0014	7.6
2880	1.004	1.002	21	15.8	0.01348	0.0010	5.0



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	HSR
SS19	(ML) Sandy Silt	0	44.4	39.9	15.7	0.5				TES#:	23502-ZS9
										Boring#:	S0020R
										Date:	9/12/2013

\* Particles smaller than 5 Micron in diameter



Construction Testing & Inspection \* Geotechnical & Environmental Engineering

## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	9/23/2013
TES#:	23502-ZS9	Sample No.:	MC22-2
Boring #:	S0020R; 95.5-96'	Classification:	(ML/CL) Clayey Silt

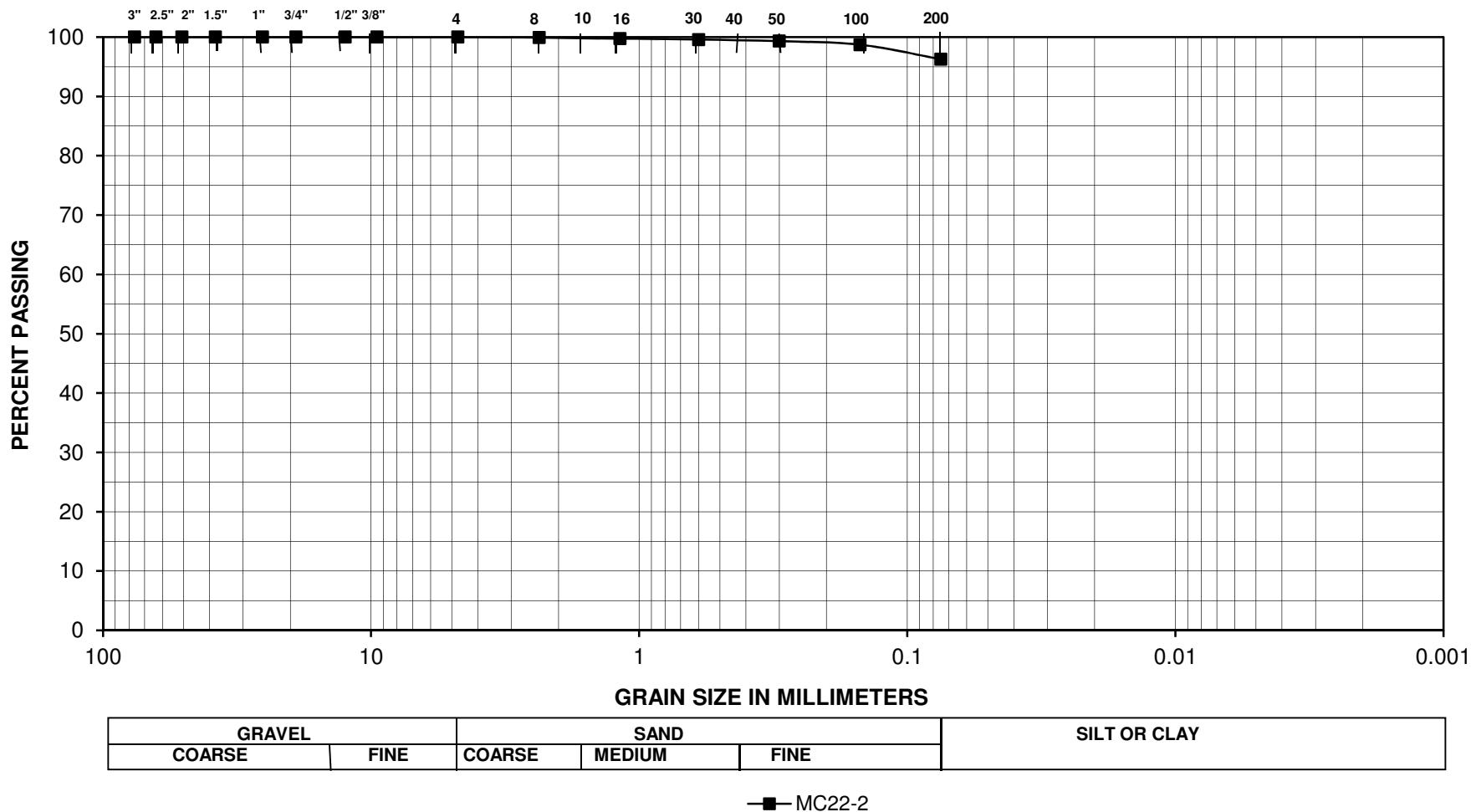
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	117.5	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	117.5	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	22	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.1	0.1	0.1	99.9	
#16	0.3	0.2	0.3	99.7	
#30	0.5	0.2	0.4	99.6	
#50	0.8	0.3	0.7	99.3	
#100	1.5	0.7	1.3	98.7	
#200	4.4	2.9	3.7	96.3	
Pan	22				



## **U.S. STANDARD SIEVE OPENING IN INCHES**

## **U.S. STANDARD SIEVE NUMBERS**





Construction Testing & Inspection \* Geotechnical & Environmental Engineering

## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	9/23/2013
TES#:	23502-ZS9	Sample No.:	SS23
Boring #:	S0020R; 101-101.5'	Classification:	(ML/CL) Silty Clay

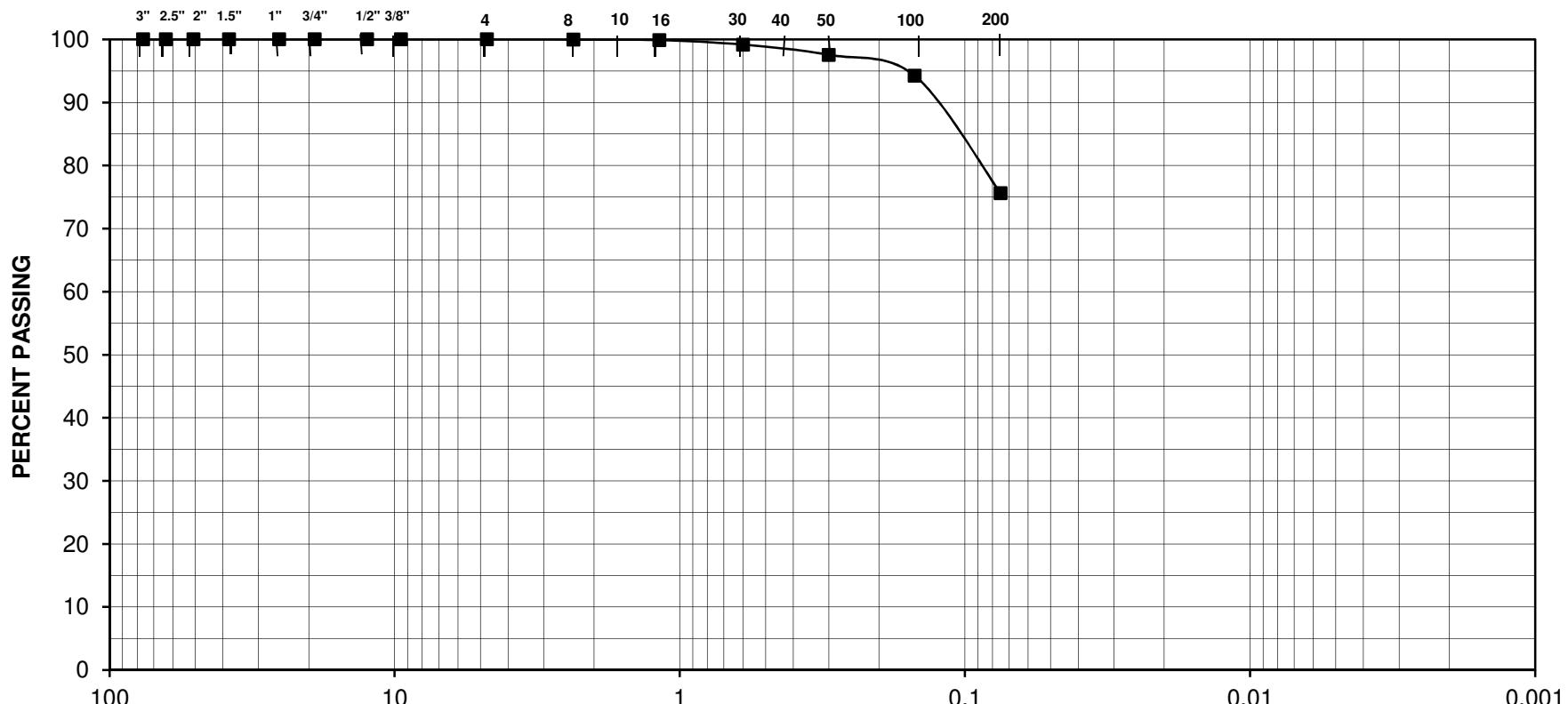
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	264.8	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	264.8	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	93.2	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.1	0.1	0.0	100.0	
#16	0.3	0.2	0.1	99.9	
#30	2.2	1.9	0.8	99.2	
#50	6.5	4.3	2.5	97.5	
#100	15.2	8.7	5.7	94.3	
#200	64.6	49.4	24.4	75.6	
Pan	93.2				



## **U.S. STANDARD SIEVE OPENING IN INCHES**

## **U.S. STANDARD SIEVE NUMBERS**



GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

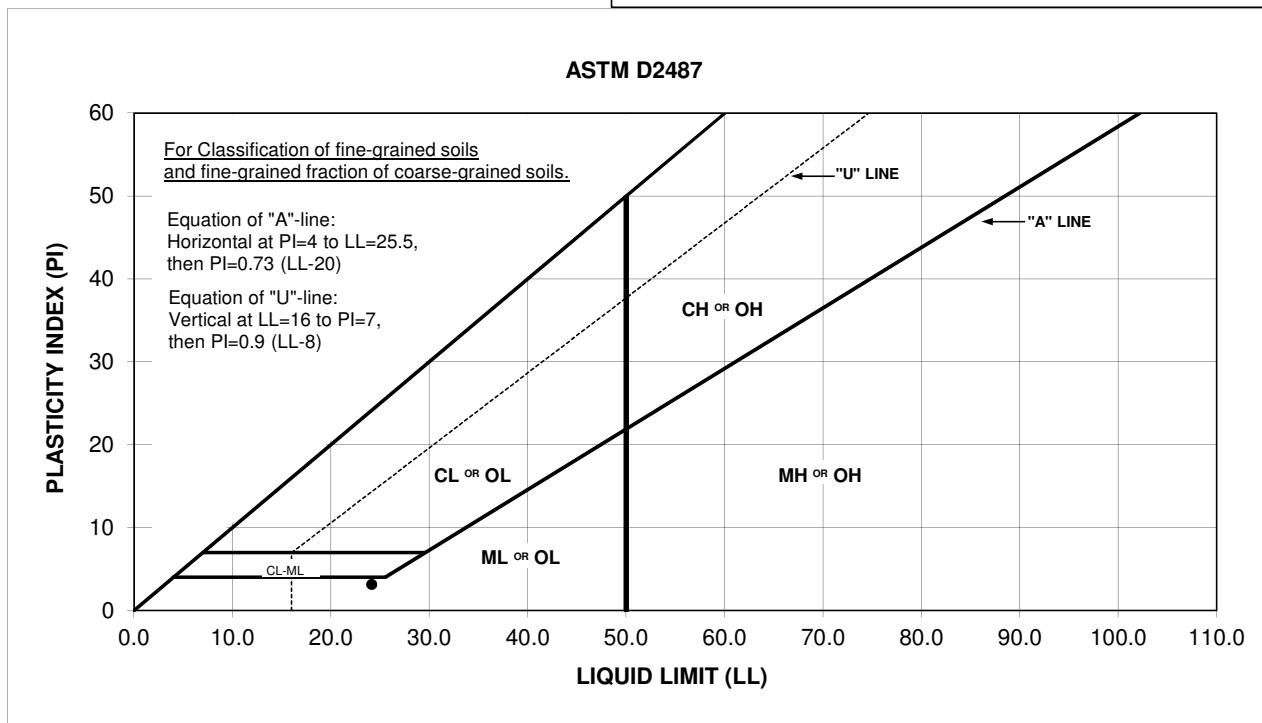
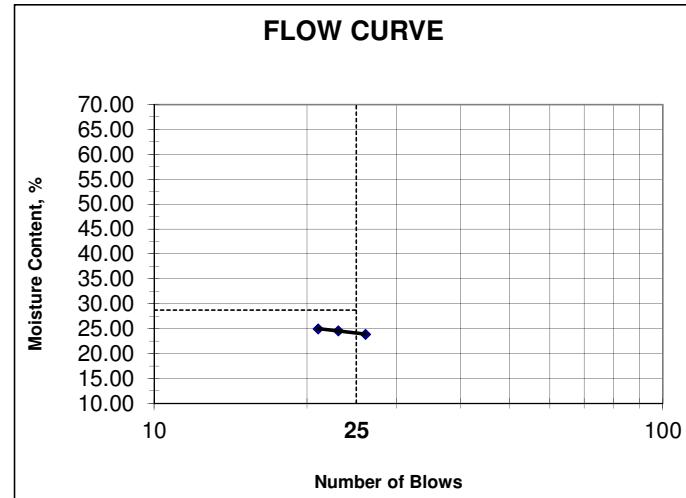
— SS23

**Determination of Atterberg Limits**  
ASTM D 4318, CTM 204

Project Name:	HSR	Project No.:	23502-ZS9	
Soil Boring No:	S0020R	Depth:	36-36.5'	
Sample No.:	SS09	Date: 9/19/13 Tested By: K. Ford		
Classification: (SM) Silty Sand				

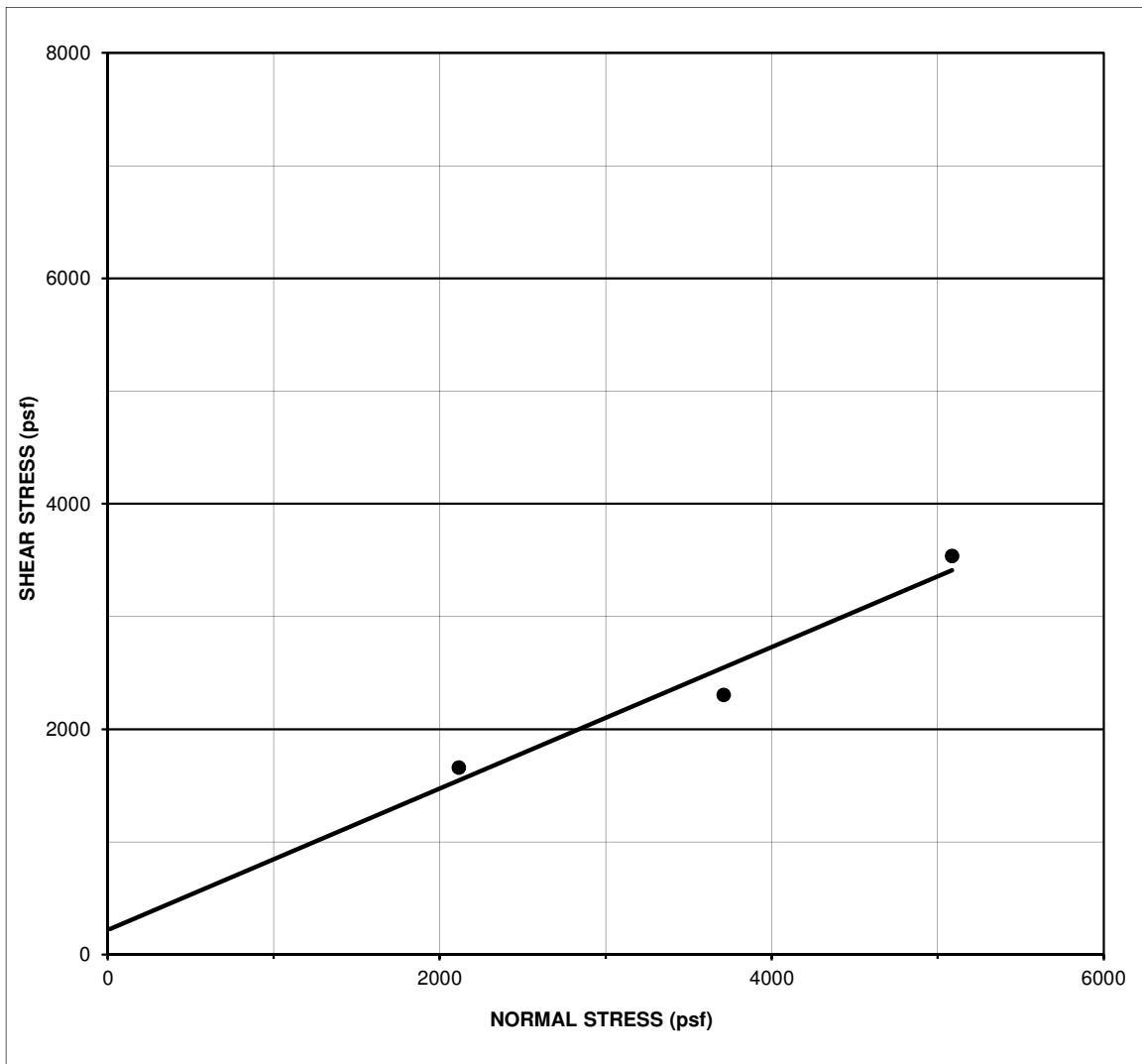
	PLASTIC LIMIT			LIQUID LIMIT			
	1	2	3	No. of Blows	21	26	23
A Tes No.							
B Tare No.							
C Mass of Pan + Dry Soil, g	25.20	34.20	33.00		34.70	25.30	34.40
D Mass of Pan + Wet Soil, g	26.20	35.40	34.00		36.30	26.40	35.90
E Mass of Pan, g	20.60	28.20	28.30		28.30	20.70	28.30
F Mass of Water, g	1.00	1.20	1.00		1.60	1.10	1.50
G Mass of Dry Soil, g	4.60	6.00	4.70		6.40	4.60	6.10
H Moisture Content, %	21.74	20.00	21.28		25.00	23.91	24.59
I Average Moisture Content, % (PL)		21.01					

Liquid Limit:	24.1
Plastic Limit: Line I	21.0
Plasticity Index: $PI = LL - PL$	3.1





**Direct Shear Test**  
**ASTM D3080**



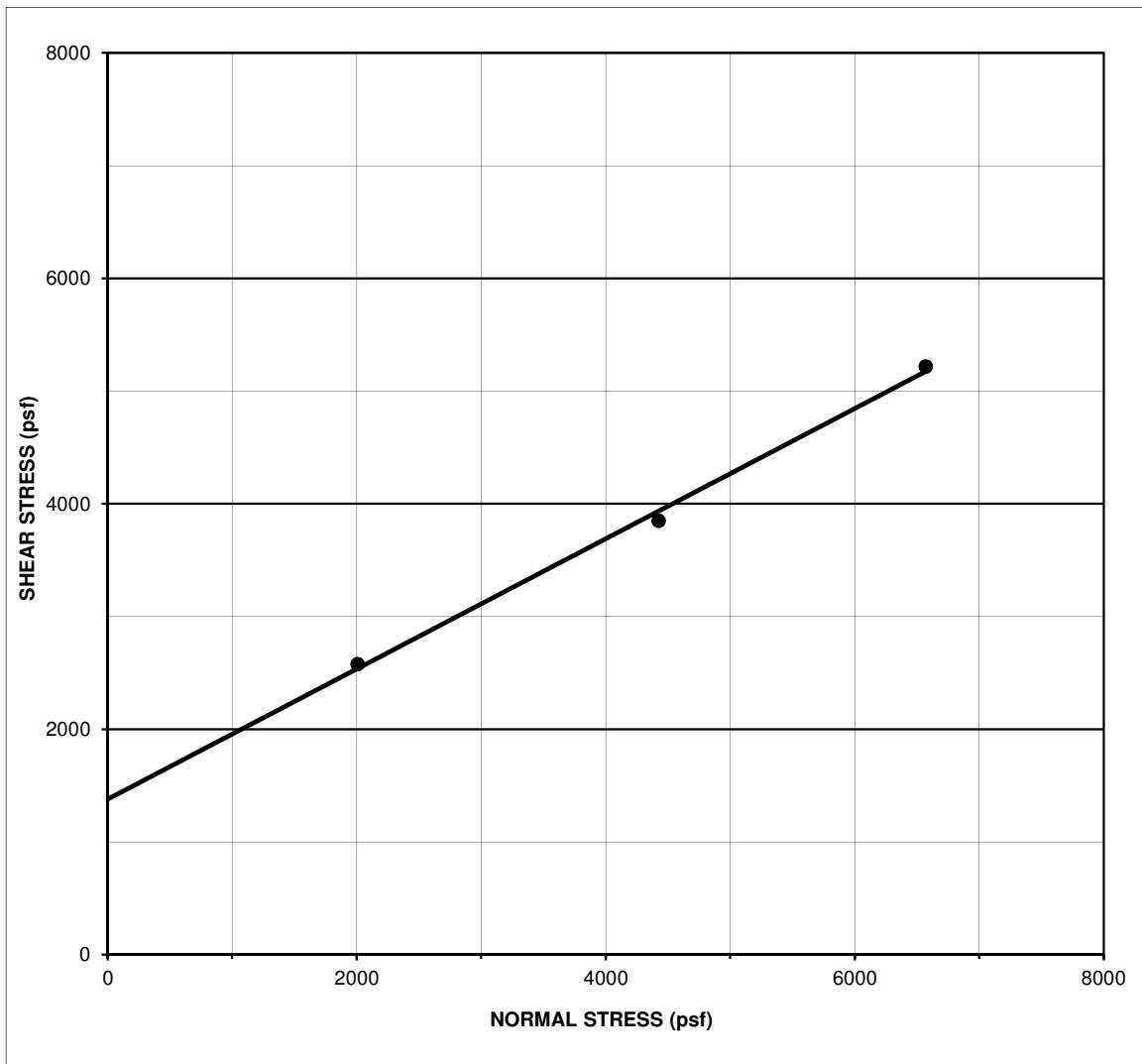
PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	9/7/2013
BORING NO.:	S0020R
SAMPLE NO.:	MC04-1 Depth(11'-11.5')
DESCRIPTION:	Fine Sand (SP)

Cohesive Pressure, psf	220
Internal Friction Angle	32

SPECIMEN	A	B	C	D	E
DRY DENSITY (pcf)	106.1	106.1	106.1	---	---
INITIAL WATER CONTENT (%)	6.3	6.3	6.3	---	---
FINAL WATER CONTENT (%)	21.00	22.00	23.00	---	---
NORMAL STRESS (psf)	2115	3711	5086	---	---
MAXIMUM SHEAR (psf)	1659	2304	3538	---	---



**Direct Shear Test**  
**ASTM D3080**



PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	9/7/2013
BORING NO.:	S0020R
SAMPLE NO.:	MC06-1 Depth(21'-21.5')
DESCRIPTION:	Silty Sand (SM)

Cohesive Pressure, psf	1380
Internal Friction Angle	30

SPECIMEN	A	B	C	D	E
DRY DENSITY (pcf)	90.2	90.2	90.2	---	---
INITIAL WATER CONTENT (%)	33.3	33.3	33.3	---	---
FINAL WATER CONTENT (%)	25.60	28.70	24.30	---	---
NORMAL STRESS (psf)	2009	4426	6572	---	---
MAXIMUM SHEAR (psf)	2577	3851	5219	---	---